Development N2O and CH4 fluxes in Danish oak and Norway spruce forests - using chronosequence to study long-term trends

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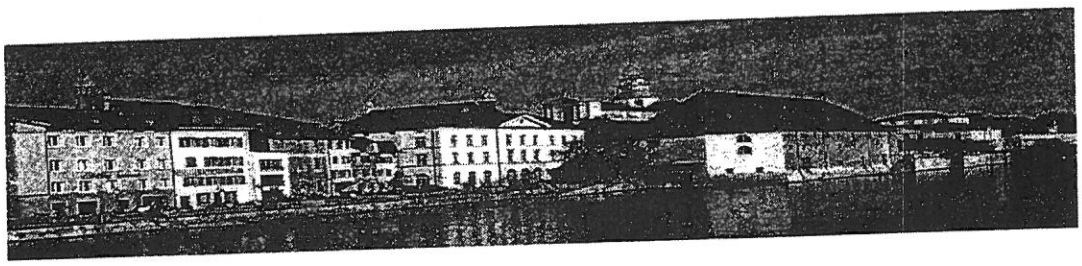

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temperature and moisture within the tunnels was not observed. Measurements were conducted within randomized block designed research platform (CROPSYS) in late spring - early autumn of 2009.

1.6. NO-O_3-NO_2 fluxes by gradient, eddy-covariance, and automatic chambers over a bare soil following slurry incorporation

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Owing to their important role in tropospheric chemistry, NO_x (NO and NO_2) are important gaseous species in the atmosphere. NO_x determine the oxidative capacity of the atmosphere by controlling the ozone production and consumption. The major sources of NO_x in the atmosphere are the combustion of fossil fuel, biomass burning and production from soil microbes.
The poster presents measurements of O_3, NO and NO_2 fluxes over a bare agricultural soil by a gradient system coupled with fast response sensors of NO (Ecophysics, CLD780TR), NO_2 (Luminol, LMA) and O_3 (Sextant LTD, FOS). Additionnaly, the O_3 fluxes were measured with the eddy-covariance method using a NOAA fast ozone sensor, and the NO and NO2 emissions were measured with 5 automatic chambers coupled with a 42C ThermoEnvironment Sci instrument.
The experiment took place two weeks following slurry spreading and incorporation. Moreover, due to its geographical localisation (near Paris), the parcel is submitted to anthropogenic pollution from Paris and local advection of NO emitted from traffic lines.
The NO-NO_2-O_3 fluxes measured with the different methods are compared. Specific attention is given tot the gradient-flux correction for these chemically reactive species, using information of the correlation between O_3, NO and NO_2 fluctuations to evaluate the effective chemical reaction constants between the three species as a function of height.
Then the kinetics of the NO emissions and the associated O_3 fluxes are then examined, in conjunction with micromet conditions and soil water content.

1.7. Development N_2O and CH_4 fluxes in Danish oak and Norway spruce forests – using chronosequence to study long-term trends

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Afforestation of former agricultural land is a widely used practice across Europe to provide ecosystems services, such as groundwater protection and creating habitats to enhance biodiversity. Furthermore, forests are also able to sequester atmospheric carbon (C) and afforestation can thus be a means to mitigate anthropogenic greenhouse gas (GHG) emissions. However, the net GHG exchange due to land use change also depends on the magnitudes of

fluxes of the strong greenhouse gasses N2O and CH4 as well as the development of the forest soil over long time periods.
A recently afforested arable soil will likely contain more available mineral N than older afforested soils. However, dependent on the tree species used in the afforestation process, the input of atmospheric N varies and dense canopies provide larger fluxes of N than more open canopies.
It is thus hypothesised for N2O 1) that fluxes of N2O is larger in recently afforested soils compared to soils that have been under forest for a longer time period 2) that the flux of N2O will not be reduced to the same degree in forests receiving high amounts of atmospheric N as compared to more open forests that receive less atmospheric N.
For CH4 it is hypothesised 3) that the uptake of CH4 is less in recently afforested soils compared to soils that have been under forest for a longer time period 4) that the CH4 uptake of forest soils receiving high amounts of atmospheric N will not increase to the same degree as compared to more open forests that receive less atmospheric N.
To test these hypotheses we measured GHG fluxes on a monthly basis in 16-yr and 39-yr old monoculture oak stands as well as in a 12-yr and 40-yr old monoculture Norway spruce stands for two years.

1.8. N_2O, CH_4 and CO_2 fluxes from a rice paddy field and a mountainous grassland in Spain

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Discrete measurements of N_2O, CH_4 and CO_2 were carried out with closed chambers to assess main GHG emissions in two different ecosystems in Spain: a rice paddy field located close to Valencia and a mountain grassland, located in the Pyrenees, which is a Nitroeurope-IP level 1 site.
GHG fluxes were measured using manually operated static chambers during the active vegetation period in 2009. For the paddy rice field (Sueca), 6 special chambers with variable height were designed in order to be able to cope with the rice growth . For the grassland site (Alinyà), 8 stainless steel collars (40 cm diameter and 12cm height) were inserted about 8 cm deep in the soil in order to have both a correct sealing of the chambers and to repeat the measurements at the same locations during the whole experiment.
In the rice paddy field, measurements were performed from May to December 2009 with a biweekly periodicity during the active crop period (May - September). In the grassland, measurements were performed every month during the "growing season" (April-October). Two measurements were performed at each sampling day (about 8h and 14h, local time) to assess potential temperature sensitivity of GHG emissions. At grassland site soil CO2 efflux was also measured by means of an IRGA (EGM-4 SRCI, PP-systems, UK) in the 8 GHG collars and in 40 others collars, in order to validate the GHG measurements and for assessment of spatial variability in fluxes to assess the representativity of the GHG measurements performed with static chambers.